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BOOK REVIEWS AND NOTICES

Graphic Methods for Presenting Facts. By WILLARD C. BRINTON.
New York: The Engineering Magazine Co., 1914. 4to, pp.
xi+371. \$4.00

No one can question the growing popularity of graphic methods of presentation. Social survey exhibits, the publications of the various scientific associations, commission reports, magazine advertising pages—all bear indisputable testimony to the wider recognition of the usefulness of this means of showing quantitative results. Mr. Brinton's book is therefore a timely publication. It commands attention because clearly it is appropriate to the needs and interests of the day.

The book merits consideration also because it is the most detailed and comprehensive work yet published on the subject. Heretofore, to secure a satisfactory conception of the graphic method as a whole, it has been necessary to deal with widely scattered sources. Commendable examples of the graphic method have often been masked behind masses of material having no relation to the work of the statistician. *Graphic Methods for Presenting Facts* has the unique distinction of being the first attempt to give the subject as a whole a detailed and well-balanced treatment.

The general plan of the book is fairly simple. The first chapters deal with bar, circular, and pictorial presentations of component parts of a whole, and simple comparisons. A chapter on time charts is followed by six chapters upon the construction of curves and their use to show comparative time changes, component parts, accumulating totals, frequency distributions, and correlations. The consideration of map presentations occupies the two succeeding chapters. The remainder of the book is chiefly concerned with the use of the graphic method by business heads in analyzing business results and conditions, and in reporting to the stockholders. A chapter entitled "General Methods" serves as a catch-all for sundry matters relating to tabulating and calculating devices, photographic reproduction of charts, the construction of models in three dimensions, and the desirability of curves and charts in political campaigns. A few cautions and suggested rules for standardization bring the book to a close.

The effectiveness of much of the work must be conceded. The use of a large number of illustrative diagrams contributes much to this result. These illustrations are drawn from every variety of source, and give ample evidence of the author's wide exploration and discriminating selection of specimens. Some of the diagrams have been newly drawn under the author's direction. All are clearly titled, and in small type beneath each is a searching and unsparing criticism of the methods employed in its construction. Mr. Brinton is to be congratulated upon the excellence of the diagrammatic reproductions and upon the impressiveness of their use in connection with his arguments.

The argument brings to judgment in turn the various forms commonly employed in graphic presentation. And the author does not hesitate to condemn several of the most highly sanctioned graphic practices. Thus the widely recommended use of circles in comparisons of size he thinks "should be strictly avoided." And, upon the whole, his reasoning carries conviction: accurate visual comparison of the areas of circles is impossible; horizontal bars possess all the advantages of the circle with none of its disadvantages.

Most of the cartoon or pictorial forms so commonly employed in advertising are ruled out of court upon the same grounds: that they are visually misleading. It is doubtful if the author's verdict will be so generally accepted in this case. Not but that his premise is secure: accurate visual comparison of most of the cartoon forms is obviously impossible. But probably no accurate comparison is intended. The advertiser aims first at catching the attention, second at fixing a significant image upon the mind. Impressiveness is the *sine qua non* of his figures; given this, he may well scorn accuracy of visual interpretation. So long as Mr. Brinton fails to offer substitutes as striking as the forms he would discard—and his standard forms seem generally defective in this respect—he may expect to find advertisers still using the inaccurate forms which so successfully catch the fleeting glances of the reading and purchasing public.

Another well-established graphic type which the author thinks should be discarded is the polar form so commonly used to show monthly fluctuations in death-rates. According to Mr. Brinton, "this type of chart should be banished to the scrap heap. . . . It is difficult to see how such an unsatisfactory type of chart ever came into general use, unless it was because there are twelve months in the year, and twelve hours on the face of the clock." It seems to the reviewer, however, that the polar form has one valuable characteristic not possessed by the curve

forms which the author would substitute for it: it suggests more clearly than does any other diagram, the repeating cycle. For example, in considering seasonal fluctuations in infant mortality the average for December is as closely bound to that of January as it is to that of November, and only by the polar form is this visually manifest. Nor is the diagram difficult to read if units along the radii are indicated by properly spaced concentric circles.

One may well sympathize with the author's unfavorable opinion of the pyramid presentation of age- and sex-distribution. A full comparison of the different components of a population is not easy when the facts are presented in this form. Yet the pyramid has been so widely used for this purpose, is so commonly understood, and as a whole seems to give so real a picture of age- and sex-composition that probably the form will long be sanctioned.

The constructive recommendations of the book merit careful examination. They are too numerous, however, to be considered in detail here. For the most part they follow current prevailing opinion among statisticians. The author's high estimate of the worth of bar and map forms, of organization charts, and of curves drawn to rectilinear coordinates may well be heartily seconded. These are among the most useful of the well-worn instruments of the graphic method, and their still wider adoption is to be recommended.

No general criticism of Mr. Brinton's work can fairly be made without due recognition of the purpose with which he has written. In his preface he states that in the preparation of the book "there has been constant effort to present the subject from the point of view of the business man, the social worker, and the legislator." It is hoped that the book will "prove convenient to the engineer, the biologist, and the statistician," but these have not been held primarily in mind. To create "a handbook for anyone who may have occasional charts to prepare" has been the definite aim of the author. With this underlying purpose in mind, what may be said of the work?

One general defect should be pointed out: a faulty organization of material. There are two general modes of arranging analyses of the graphic method: first, according to the geometric forms employed—points, lines, surfaces, solids; secondly, according to the nature of the quantitative fact to be displayed—component parts of a whole, fluctuations of a variable in space or time, accumulating masses, etc. Without doubt, the first is the simpler of the two arrangements; almost as certainly the second is the more serviceable—more serviceable because we

turn to the graphic method of presenting facts only when the nature of the facts has been largely determined. Thus the question ordinarily is not "What may be shown with a given geometric form?" but "What geometric form is best adapted to presenting a given quantitative fact?"

In *Graphic Methods for Presenting Facts* neither of these two arrangements is consistently followed. The earlier chapters imply a presentation according to the purpose for which the different forms are to be employed; and the bulk of the book appears to follow this lead. But several of the chapters are organized on the basis of the geometric features of the modes of presentation under discussion. Furthermore, matter is occasionally introduced seemingly out of the established order. Thus, though correlation is dealt with in chap. x, some of the best examples given are presented in chap. vii, on the "Comparison of Curves." Again, consideration of the geometric representation of three related variables is relegated to a conglomerate chapter entitled "General Methods." Mr. Brinton's book would surely prove more serviceable—especially as a handbook—if its matter were more consistently and logically arranged.

One striking feature of the book is an almost entire absence of references. Apart from the diagrams, not more than three or four appear from cover to cover. Even when passages are quoted, no indication is given of the source. This lack will not seriously interfere with the usefulness of the work for the purposes for which it is primarily intended; but a liberal suggestion of outside materials and sources strengthens any discussion and lends a desirable appearance of familiarity with the accomplishments of other workers in the same field.

One hesitates to criticize the refreshing enthusiasm which so frequently lends interest and zest to the author's pages. At times he writes with the earnestness of the prophet with a cause. His faith in the possibilities of the graphic method is unbounded—it may become an "international language." But this commendable enthusiasm leads at times to an excess of statement which impairs his argument. The difficulties of ordinary numerical statements are exaggerated (see p. 4); the efficacy of graphic presentation is overstated. The author's description of the displacement of the political harangue by the illustrated lecture, showing by curves the good and evil in the contending parties, is a delightful bit of imagery. Were he an "unpractical college professor" it would be the reviewer's clear duty to pronounce him an "academic dreamer."

But these less favorable features of the book should not be allowed to overshadow its real merit. It contains much that is certain to be highly suggestive and useful to advertiser and business executive. Its criticisms

of the various pictorial forms, its exceptional offering of varied illustrative diagrams, its chapter upon pin maps offer much to the trained statistician. On the other hand, color work is given but scant attention, and the possibilities of curved presentations are not developed as highly as by Bowley (*Elements of Statistics*, chap. vii). The highly interesting chapter on "Cumulative or Mass Curves" indicates the usefulness of the graphic method in one direction in ascertaining rather than presenting facts; but in general the book does not bear on the use of the graphic method as an aid in the discovery of scientific principles, in the detection of errors in the data, and in the determination of means of position. The book is essentially a handbook on the technical problems of graphic presentation. It might perhaps better have been entitled "The Technique of Graphic Presentation." Its suggestions as to most satisfactory materials, standard forms, methods of photographic reproduction, etc., would alone justify its publication and place all who use graphic methods in debt to the author.

This review would not be complete did it not mention an ideal to which the author repeatedly refers in his book—that of standardizing the methods of graphic presentation so as to make them readily intelligible to all. The ideal is not a novel one, having been discussed in both this country and England at least as early as thirty years ago. Many considerations are involved. The graphic method as employed for mere presentation differs essentially from the graphic method used for other purposes. If presentation alone is concerned, what might well be standard practice for one group of readers will not serve for another. Less worthy modes of graphic presentation which have long been in use may advance the claim that familiarity and consequent ease of interpretation is one of the strongest arguments in favor of any graphic device. Many a dispute concerning the best mode of presentation will resolve into an issue which only the psychological laboratory, with its facilities for accurate measurements of visual impressions, can properly settle.

But standardization is nevertheless worth striving for. Graphic methods are moving in the direction of established forms and practices, and every advance in this direction means greater effectiveness. The Joint Committee on Standards for Graphic Presentation, appointed by fifteen of the most interested bureaus and scientific societies in the United States, may accomplish much in this direction. But no single-handed agency will contribute more to the cause of standardization than Mr. Brinton's valuable book.

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